## CLAIMS

What is claimed is:

1. A distributed multiprocessing computer system, comprising:

a plurality of processor nodes each coupled to an associated memory module, wherein each memory module may store data that is shared between said processor nodes;

a Home processor node that includes a data block and a coherence directory for said data block in an associated memory module;

an Owner processor node that includes a copy of said data block in a memory module associated with the Owner processor node, said copy of said data block residing exclusively in said memory module;

a Requestor processor node that encounters a read or write miss of said data block and requests said data block from the Home processor node; and

wherein said Home processor node receives the request for the data block from the Requestor processor node, forwards the request to the Owner processor node for the data block and performs a speculative write of the next directory state to the coherence directory for the data block without waiting for the Owner processor node to respond to the request.

2. The distributed multiprocessing computer system of claim 1, wherein the speculative write of the next directory state occurs only if the next directory state cannot be determined and the Home processor node and Owner processor node are two different processor chips in the computer system.

3. The distributed multiprocessing computer system of claim 1, wherein the memory module containing the coherence directory for the data block is in a low latency state that reduces memory read and write access times while the Home processor node is performing the speculative write of the next directory state to the coherence directory for the data block.

4. The distributed multiprocessing computer system of claim 1, further comprising correcting the next directory state for the data block if the response by the Owner processor node to the Home processor node request for the data block indicates a different next directory state from the next directory state speculatively written by the Home processor node to the coherence directory for the data block.

5. A distributed multiprocessing computer system, comprising:

a plurality of processor nodes each coupled to an associated memory module, wherein each memory module may store data that is shared between said processor nodes;

a first processor node that includes a data block and a coherence directory for said data block in an associated memory module;

a second processor node that includes a copy of said data block in a memory module associated with the second processor node, said copy of said data block residing exclusively in said memory module;

a third processor node that encounters a read or write miss of said data block and requests said data block from the first processor node; and

wherein said first processor node receives the request for the data block from the third processor node, forwards the request to the second processor node for the data block and performs

a speculative write of the next directory state to the coherence directory for the data block without waiting for the second processor node to respond to the request, said next directory state selected to reduce read-modify-write sequences.

6. The distributed multiprocessing computer system of claim 5, wherein the speculative write of the next directory state occurs only if the next directory state cannot be determined and the first processor node and second processor node are two different processor chips in the computer system.

7. The distributed multiprocessing computer system of claim 5, wherein the memory module containing the coherence directory for the data block is in a low latency state that reduces memory read and write access times while the first processor node is performing the speculative write of the next directory state to the coherence directory for the data block.

8. The distributed multiprocessing computer system of claim 5, further comprising correcting the next directory state for the data block if the response by the second processor node to the first processor node request for the data block indicates a different next directory state from the next directory state speculatively written by the first processor node to the coherence directory for the data block.

9. The distributed multiprocessing computer system of claim 5, wherein the speculative write of the next directory state releases hardware contained in the first processor node, allowing said

first processor node to accept requests for data blocks and coherency directories for said data blocks stored in the memory module of the first processor node.

10. A distributed multiprocessing computer system, comprising:

a plurality of processor nodes each coupled to an associated memory module, wherein each memory module may store data that is shared between said processor nodes;

a Home processor node that includes a data block and a coherence directory for said data block in an associated memory module;

an Owner processor node that includes a copy of said data block in a memory module associated with the Owner processor node, said copy of said data block residing exclusively in said memory module;

a Requestor processor node that encounters a read or write miss of said data block and requests said data block from the Home processor node;

wherein said Home processor node receives the request for the data block from the Requestor processor node, forwards the request to the Owner processor node for the data block and performs a speculative write of the next directory state to the coherence directory for the data block without waiting for the Owner processor node to respond to the request; and

a disk drive coupled to each of said plurality of processor nodes.

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